CAMECO CORPORATION
Corporate Office
2121 – 11th Street West
Saskatoon, Saskatchewan
Canada S7M 1J3

Tel 306.956.6200
Fax 306.956.6201
www.cameco.com

January 22, 2015

David Henderson
U.S. Department of Energy
Office of Nuclear Energy
Mailstop NE-52
19901 Germantown Road
Germantown, MD 20874-1290

Dear Mr. Henderson:

Re: Request for Information on the Department of Energy's Excess Uranium Management

Cameco Corporation ("Cameco") appreciates the opportunity to provide an industry perspective on the U.S. Department of Energy's ("DOE" or "Department") management of its excess uranium inventories. As DOE begins preparing a 2015 Secretarial Determination, Cameco urges that the Department establish a transparent process for transfers from its excess uranium inventories that establishes clearly defined limits and provides predictability to the uranium industry.

The December 8, 2014 Request for Information ("RFI") asked for comments on seven questions regarding "the effects of DOE's planned transfers of its excess uranium to the uranium market and possible consequences for domestic uranium industries." The RFI also requested comments "about factors DOE should consider and/or the methodology it should use in assessing the possible impacts of transfers." DOE indicated that it will take the information it receives in response to the RFI into consideration as it prepares a new Secretarial Determination, which will be finalized in the spring of 2015.

A strong domestic uranium sector is consistent with the Administration's "all of the above" energy strategy and President Obama's Climate Action Plan. However, the U.S. uranium mining industry today produces only about five million pounds annually which is equivalent to approximately 10% of U.S. reactor requirements. This clearly indicates the need for uranium from stable and reliable trade partners such as Canada (one of the leading uranium producing countries in the world).

Enhanced U.S. production of uranium, along with production from Canada, will ensure the U.S. reactor fleet has access to secure North American sources of uranium. Recent unrest in Russia, Africa and in the Middle East underscores the importance of reliable North American production. U.S. nuclear reactors generate approximately 20% of U.S. electricity needs and constitute the largest source of low-carbon energy generation in the U.S. Both President Obama and Secretary of Energy Ernest Moniz have recognized the role that nuclear energy must play if the U.S. is to meet its greenhouse gas emission reduction goals.[1]

For these reasons, it is essential that DOE carefully manage its excess uranium inventories, and Cameco is pleased to offer some suggestions on actions the Department can take to mitigate the impact of transfers on the uranium mining and conversion industry. In particular, Cameco supports enhanced transparency and predictability associated with future DOE transfers, barters or sales. DOE should return to the cap on transfers of 10% of annual U.S. reactors' requirements, a limit which was a product of cooperative efforts with the domestic nuclear industry (both utilities and producers) and a hallmark of the 2008 Excess Uranium Management Plan ("2008 Plan"). This agreement provided producers with some degree of certainty as to future transfers of excess materials entering the marketplace from federal stockpiles, and the opportunity to plan accordingly.

Another important action DOE can take is to limit transfers of material that are placed into either the spot or near term market. Moreover, industry leaders like Cameco could partner with DOE on introducing this uranium into the market by placing it into already existing long term contracts, thereby mitigating the negative pressure on spot and near term market prices. These actions, among others, would allow DOE to pursue important environmental cleanup work in Portsmouth, Ohio, and Paducah, Kentucky, ensure that the Department complies with its statutory obligations in Section 3112 of the United States Enrichment Corporation ("USEC") Privatization Act to prevent an "adverse material impact" to the domestic uranium sector, and realize a reasonable price for its excess uranium.

ABOUT CAMECO

Cameco is one of the world's largest uranium producers, providing approximately 15 percent of the world's production from mines in the U.S., Canada, and Kazakhstan. The U.S. nuclear fleet depends on Cameco for about 30% of its uranium needs.

---

[1] Remarks by the President on Climate Change (June 25, 2013), *available at* http://www.whitehouse.gov/the-press-office/2013/06/25/remarks-president-climate-change. A Statement from U.S. Secretary of Energy Ernest Moniz on the Intergovernmental Panel on Climate Change's Final Synthesis Report (Nov. 3, 2014), *available at* http://energy.gov/articles/statement-us-secretary-energy-ernest-moniz-intergovernmental-panel-climate-change-s-final.

Cameco Resources, the U.S. subsidiary of Cameco, is the U.S.'s largest uranium producer, producing about one-half of the domestically produced uranium. Cameco Resources operates the Smith Ranch-Highland mine in Wyoming and the Crow Butte mine in Nebraska, and is exploring opportunities to expand operations in both states. Over the past 10 years, Cameco Resources has invested $396 million in Wyoming and Nebraska.

Cameco Resources' operations support 45 jobs in Nebraska and 171 jobs in Wyoming, along with 75 contractors at the Smith Ranch-Highland and North Butte mines. In 2010, a University of Wyoming study found that Cameco Resources' operations in the state generate an additional 1.6 jobs in the community through direct and indirect impacts.

Other U.S. subsidiaries include Cameco Inc., located in Eden Prairie, Minnesota, which is responsible for marketing both uranium and processing services on a worldwide basis, and Cameco Enrichment Holdings, which holds a 24% interest in Global Laser Enrichment, which is pursuing the deployment of laser enrichment technology along with Hitachi and GE, and the construction of a facility in Kentucky to re-enrich DOE tails.

Cameco operates the world's largest and highest grade uranium mines in Canada and is a leading provider of nuclear fuel processing services, including UO_2 and UF_6 conversion services.

Cameco has extensive experience dealing with large, unconventional secondary sources of uranium supply, including the UF_6 feed from the recently concluded U.S./Russian HEU agreement, UF_6 from the re-enrichment of European tails in Russia, and the Iraqi natural uranium stockpile.

(1) What factors should DOE consider in assessing whether transfers will have adverse material impacts?

Section 3112(a) of the USEC Privatization Act states that the DOE Secretary may not "transfer or sell any uranium (including natural uranium concentrates, natural uranium hexafluoride, or enriched uranium in any form) to any person except as consistent with this section." 42 U.S.C. § 2297h-10(a). Section 3112(d) prohibits DOE from selling or transferring natural or low-enriched uranium unless the following conditions are met:

a) The President determines that the material is not necessary for national security needs;

b) The Secretary determines that the sale of the material will not have an adverse material impact on the domestic uranium mining, conversion, or enrichment industry, taking into account the sales of uranium under the Russian HEU and the Suspension Agreement; and

c) The price paid to the Secretary will not be less than the fair market value of the material. § 2297h-10(d).

Thus, Section 3112 of the USEC Privatization Act unequivocally prohibits DOE from making transfers of natural or low-enriched uranium ("LEU") if such transfers will have "an adverse material impact" on the domestic uranium industries.

Furthermore, Section 3112 does not provide DOE with the discretion to consider whether its actions are the primary driver of a current negative state for the domestic industry. Instead, DOE must adhere to the unambiguous requirement in Section 3112 and analyze whether its transfers will have an "adverse material impact" on the domestic uranium industries. In particular, DOE should weigh factors such as the transfers' impact on the spot price of uranium, the term price of uranium, jobs in the industry, and domestic production.

(2) With respect to transfers from DOE's excess uranium inventory in calendar years 2012, 2013, and 2014, what have been the effects of transfers in uranium markets and the consequences for the domestic uranium mining, conversion, and enrichment industries relative to other market conditions?

DOE significantly deviated from its 2008 Excess Uranium Management Plan with its 2012-2014 transfers, which created uncertainty for both the uranium industry and its investors, as it deprived the industry of predictability on the levels of future transfers into the market and undermined confidence that DOE will adhere to any future limits. The 2008 Plan largely reflected a Consensus Agreement reached by domestic fuel cycle companies and nuclear utilities.[2] These stakeholders, including Cameco, held confidence that the 2008 Plan would permit DOE to use its inventory to pursue its priorities while mitigating the impact on the uranium industry. In particular, DOE's 2008 Plan proposed gradually ramping up transfers from 1.5 million pounds in 2008 to five million pounds in 2013.[3] Five million pounds constituted approximately 10% of U.S. annual requirements for uranium. DOE stated that a 10% limit on transfers "should not have an adverse material impact on the domestic uranium mining, conversion, or enrichment industries,"[4] and the 2008 Plan outlined planned dispositions from its inventory for the period 2008 to 2017.[5]

The 10% limit on annual DOE transfers provided some measure of predictability and transparency to uranium production and conversion companies as to the levels of uranium the Department planned on selling or transferring into the market in the future. Predictability and transparency are essential to a producer's ability to attract the capital necessary for the company to maintain and expand its operations, as financial markets generally avoid allocating financial resources (or charge a significant premium) to

[2] *See* Industry Position of Disposition of DOE's Nuclear Fuel Inventory (Oct. 2007).
[3] U.S. Department of Energy, 2008 Excess Uranium Inventory Management Plan, p. 11 (Dec. 16, 2008).
[4] *Id.* at 8.
[5] *Id.* at 11.

industries that operate in unpredictable environments or are subject to irrational government interference.

Unfortunately, the Secretarial Determination issued by DOE on May 15, 2012 completely disregarded the 10% limit. In particular, the 2012 Secretarial Determination transferred 2,400 MTU (6.27 million pounds U_3O_8) annually for cleanup services at Paducah, Kentucky, and Portsmouth, Ohio and also transferred 400 MTU (1.05 million pounds U_3O_8) annually to the National Nuclear Safety Administration ("NNSA") contractors for the down-blending of highly enriched uranium ("HEU") to LEU. The amount of these transfers totaled 2,800 MTU (7.32 million pounds U_3O_8), which equaled approximately 15% of U.S. nuclear reactor requirements in 2012.[6] This disregard of the previously understood 10% limit and unilateral action by DOE to very significantly increase the volume transferred and sold into the market undermined any confidence that the uranium industry and its investors had with respect to the levels of future transfers by DOE.

In July 2013, DOE released its 2013 Excess Uranium Inventory Management ("2013 Plan"), which superseded and disregarded its 2008 Plan. The 2013 Plan formally announced that DOE will no longer abide by the 10% limit.[7] While DOE stated that it "remains committed to the maintenance of a strong domestic uranium industry," it declined to provide a new limit to replace the 10% cap.[8] Instead, DOE argued "that it can meet its statutory and policy objectives in regard to DOE uranium sales or transfers without an established guideline."[9] Disregarding the 10% cap, coupled with the decision to not replace it, deprived all producers and investors of predictability and certainty with respect to future uranium transfers by DOE. With this action, DOE essentially created a perceived "over-hang" of excess uranium to the market in the hands of an unpredictable seller. The problem is exacerbated for uranium producers because there is no way of knowing what additional government inventories may be declared excess in the future, such that the "over-hang" is perceived by the financial markets as being much larger than what is currently declared as excess material by the DOE.

Finally, on May 15, 2014, DOE issued a new Secretarial Determination, which authorized the following transfers: 2,055 MTU (5.37 million pounds U_3O_8) annually to DOE contractors for cleanup services at the Paducah and/or Portsmouth Gaseous

---

[6] The 2012 Secretarial Determination also included the transfer of up to 9,150 MTU annually of depleted uranium to Energy Northwest in CY 2012 and 2013, which would be immediately followed by enrichment into LEU equivalent to 482 MTU, with Energy Northwest utilizing a portion of the LEU for fueling its reactors. Energy Northwest would then sell the remaining LEU or in its component parts as natural uranium and separate work units to TVA as part of a commercial transaction supporting future power generation and tritium production from 2014 through 2020. While DOE analyzed the market impacts of depleted uranium transfers, the Department stated in its 2013 Plan that the transfer of this material is not subject to the USEC Privatization Act.

[7] U.S. Department of Energy, 2013 Excess Uranium Inventory Management, p. 2(July 2013).

[8] *Id.*

[9] *Id.*

Diffusion Plants; and 650 MTU (1.70 million pounds U_3O_8) annually to NNSA contractors for down-blending HEU to LEU. This amount of 7.07 million pounds U_3O_8 (in the form of UF_6) represents approximately 15% of current U.S. nuclear fuel requirements for uranium and conversion.

The lack of predictability and transparency has contributed to a depressed market for uranium that has adversely impacted all of Cameco's operations. Specifically at its U.S. operations, since 2012, Cameco has deferred development of three planned new mining sites, curtailed exploration activities, and reduced its workforce by 25%.

DOE's analysis of the impact of its transfers on the uranium market was supported by a study it commissioned from ERI. It is worth noting that ERI's study on the 2014 Secretarial Determination found that DOE's transfers would result in significant negative impacts on the domestic uranium industry. Specifically, ERI estimated that transfers of 2,075 MTU (5.42 million pounds U_3O_8) would decrease uranium prices by $2.80 per pound. This impact would constitute an 8% decrease in the spot market price and a 6% decrease in the term price, based on the spot and term prices at the time ERI conducted its analysis. For the conversion sector, ERI projected that DOE's transfers would decrease spot market prices by 12% and term prices by 6%. In addition, ERI estimated that DOE material entering the market would result in an employment loss of 44-person years, a level that constitutes a decrease on average of 4% of uranium industry employment levels from 2014 to 2023.

In analyzing the 2012 Secretarial Determination, ERI found that DOE's transfers would reduce the spot price by 5.8 to 8.9% and the term price by 3.1 to 4.4%. The reality is that the negative impact on prices forecast by ERI was significantly understated.

In December of 2014, and in response to DOE's RFI, Cameco commissioned Ux Consulting Company ("UxC"), a leading nuclear industry consulting firm, to do a study of the impact on market prices of DOE's transfers to the uranium markets. A copy of the UxC study is attached.

UxC first analyzed the impact to price by narrowly focusing on calendar years 2012, 2013 and 2014, as requested in question #2 in DOE's RFI. UxC's analysis found that DOE's transfers from 2012-2014 decreased the spot market price by 11% to an

average of $4.50 per pound (and the long term price by $2.88 per pound), which is significantly higher than the impact forecast by ERI in the study relied upon by DOE. In calendar year 2014, UxC estimates the impact on the spot market price to have been $5.87 per pound (and the long term price by $3.61), thereby negatively impacting the spot price by over 16%.

In doing the analysis, UxC advised that to fully capture the impact of DOE sales it would be necessary to include the impact of DOE sales before 2012 in addition to the impact over the 2012-2014 period, because DOE sales were already having a negative impact before 2012 and the additional sales in 2012-14 exacerbated this downward

impact on market prices. Using this method, the UxC analysis shows that average spot market prices in the period 2008-12 were on average 16% lower (down $7.11) and the long term price $5.10 lower than they would have otherwise been. The impact on the spot market price in 2014 is estimated as being $8.73 (and on the long term market price by $5.39), in effect negatively impacting the spot price by 21%."

Without question, DOE's transfers have had a very significant and negative impact on uranium market prices, which cannot be interpreted as being anything other than having a "material adverse impact" on the uranium market.

(3) What market effects and industry consequences could DOE expect from continued transfers at annual rates comparable to the transfers described in the 2014 Secretarial Determination?

The UxC study estimates that continued transfers at annual rates comparable to the transfers in the 2014 Secretarial Determination will negatively impact the spot price by an average of $5.78 over the near and medium term, such that the spot price will be 14.1% lower than it would otherwise be without the DOE transfers. The study projects that that the long term spot market price of uranium will decrease $4.47, or 7.1%, during the 2018-2030 period due to DOE transfers at current annual levels. From 2015-2030, DOE's transfers at current annual levels is projected to decrease spot market prices by 8.4%.

In the near and medium term, UxC's analysis forecasts that the negative impact of DOE's sales and transfers on the uranium term price averages about 9.0% (or $4.86/lb U_3O_8) per year. As the uranium term price improves beyond the medium term, the impact of DOE's transfers would decrease slightly to 7.1% (or $5.30/lb U_3O_8) per year for the remaining forecasting period from 2018-2030. Overall, UxC projects that DOE's sales and transfers during the forecasting period from 2015 to 2030 will push down the uranium term price by an annual average rate of 7.5% (or $5.21/lb U_3O_8).

UxC's study found that the impact of DOE's sales and transfers will always negatively affect the front-end markets in terms of prices. In particular, these impacts are exacerbated when the market conditions are being characterized as poor or weak. For example, in the near and medium terms (2015-2017), with the expected weak market conditions, UxC projected that DOE's transfers will decrease the uranium spot price by about 14% per year. This decrease compares with a smaller impact of 7.1% per year when the market is expected to show a recovery after the medium term.

(4) Would transfers at a lower annual rate significantly change these effects, and if so, how?

Transfers at lower levels, coupled with enhanced transparency and predictability associated with future Secretarial Determinations, will help to mitigate the impact on domestic uranium producers. In particular, DOE should limit transfers to a hard cap of 5

million pounds U_3O_8 in any year, which would equate to more than the 10% limit on annual transfers, as established in the 2008 Plan. This limit reflected a compromise agreement between producers, utilities, and DOE, among other stakeholders.

(5) Are there actions DOE could take other than altering the annual rate of transfers that would mitigate any negative impacts on these industries?

In addition to the volume of the transfers, the manner in which the DOE material has been sold is disruptive to the market, and DOE could take several steps to mitigate the negative impact on the uranium market and uranium producers. In particular, DOE should ensure that the material is not being sold into spot or short term contracts, given that there is very little, if any, primary demand from utility consumers for material in the short term market, and sales focused in that period result in excessive downward pressure on the price of uranium.

An alternative to short term sales is to enlist major uranium producers in helping to facilitate the entry of this source of secondary supply into the market. Cameco has a long history of managing secondary uranium supplies from many different sources as evidenced by the leading role it played in the U.S./Russia Highly Enriched Uranium Agreement (e.g., the "Megatons to Megawatts Agreement"). Cameco's participation in the Megatons to Megawatts Agreement allowed for this very large source of secondary supply to enter the commercial market in a manner that achieved the objectives of the U.S. and Russian governments for revenues, but also reduced the very significant, negative impact on the uranium market. As to DOE's excess uranium inventories, Cameco possesses the capacity to facilitate the entry of this material into the long term commercial market. Specifically, Cameco maintains a very large, long term contract portfolio into which it can feed this material, thereby avoiding the need to place it into the spot or near term markets. This type of arrangement would ensure that DOE and its contractors retain a predictable source of revenue to pay for the costs of cleanup and HEU down-blending, while at the same time significantly reducing the negative impact on market prices and uranium and conversion producers.

DOE should also enhance the transparency associated with the Secretarial Determination process. Cameco commends DOE for issuing an RFI to elicit comments from stakeholders on its management of the excess uranium inventory, but we feel that additional steps with respect to transparency can be taken to mitigate the impact of transfers. Specifically, DOE could release draft Secretarial Determinations and subject them to formal notice and comment, which will allow the Department to receive input on its proposed transfers from the industry and other stakeholders. This input can bolster DOE's understanding on the potential impacts of any transfer, thereby helping to ensure that a final Secretarial Determination does not result in an "adverse material impact" on the domestic uranium industry.

While these steps are important in mitigating the impact of DOE's transfers on the uranium industry, the most beneficial step the Department could take would be to decrease the amount of material and establish a cap on annual transfers into the market.

(6) Are there actions DOE could take with respect to the transfers that would have positive effects on these industries?

As highlighted by UxC's study, the impact of DOE's sales and transfers will always negatively affect the front-end markets in terms of prices, and these impacts are exacerbated when the market conditions are being characterized as poor or weak. What DOE can do is take actions to mitigate those negative impacts with the actions proposed in Question #5 above.

(7) Are there any anticipated changes in these markets that may significantly change how DOE transfers affect the domestic uranium industries?

As stated in Question #6, DOE's sales and transfers will always negatively affect the front-end markets in terms of price. While these impacts are exacerbated when market conditions are negative, DOE's sales and transfers are still projected to have negative effects in an improving uranium market. Thus, Cameco's suggestion is that DOE should focus on actions to mitigate the negative impacts as outlined in our response to Question #5.

CONCLUSION

Cameco recognizes that DOE has obligations to pursue environmental cleanup at legacy facilities, such as those in Paducah, Kentucky, and Portsmouth, Ohio, and down-blending of HEU into LEU. From Cameco's perspective, lower uranium prices not only hurt the domestic uranium industry, but also undermine the ability of DOE to accomplish its objectives of environmental cleanup and HEU down-blending. Cameco is willing work with DOE to garner increased Congressional appropriations for these activities. Moreover, to the extent that DOE will continue to rely on the barter program, Cameco remains committed to working with DOE on establishing a management plan that is transparent and predictable, with an absolute limit on the annual amount of transfers into the market, which would allow domestic uranium producers to plan appropriately for the future while permitting DOE to accomplish its objectives.

Yours truly,

Alice Wong

Alice Wong
Senior Vice President and Chief Corporate Officer